

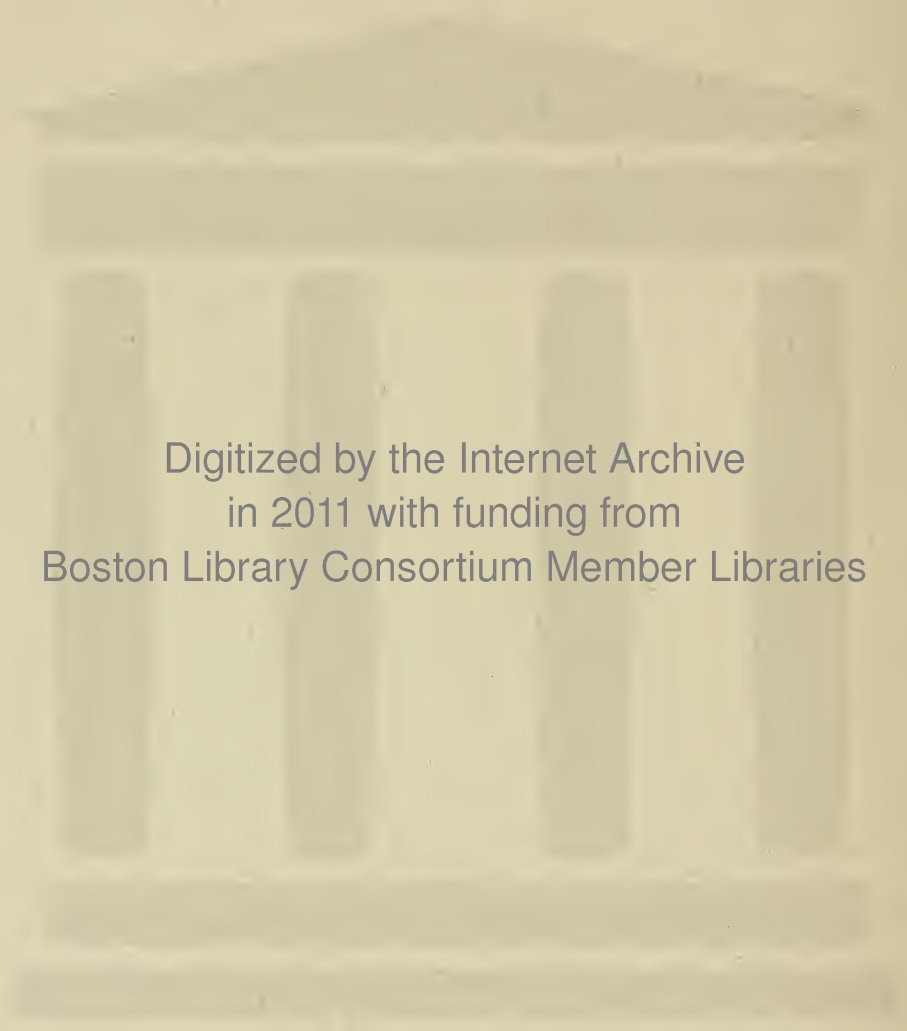


Northeastern University

# GRADUATE PROGRAMS IN PHARMACY AND HEALTH SCIENCES

*Course Descriptions*  
*1992-1993*

Boston, Massachusetts



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**INT 3101 Biochemistry 1 2 QH**

Offers a description of the biochemical components of the cell including carbohydrates, lipids, prostaglandins, steroid hormones, amino acids, polypeptides, proteins, purines, pyrimidines, nucleosides, nucleic acids, and vitamins. Considers buffers, Henderson-Hasselbalch equation, and the importance of pKa. *Prereq.* One year of organic chemistry.

**INT 3102 Biochemistry 2 2 QH**

Discusses enzymes, enzyme kinetics, and mechanisms of enzyme reactions, of intermediary metabolism and of biological oxidation-reduction reactions, bioenergetics, and the electron transport chain. Considers carbohydrate metabolism including the glycolytic pathway, the citric acid cycle, and the pentose phosphate pathway. *Prereq.* INT 3101.

**INT 3103 Biochemistry 3 2 QH**

Presents lipid metabolism, including the fatty acid cycle, the biosynthesis of fatty acids, and the biological formation of the prostaglandins, cholesterol, and steroid hormones. Studies the metabolism of the various amino acids, including the urea cycle, one-carbon fragments, transamination reactions, and aromatic hydroxylations. Discusses metabolism of nucleic acids and their building blocks, as well as the genetic basis of protein synthesis, the genetic code, and the mechanisms of control. *Prereq.* INT 3102.

**INT 3201 Applications of Mass Spectrometry 2 QH**

Examines the principles governing the fragmentation and ionization of organic molecules, the interpretation of mass spectra, and applications of mass spectrometry to the solution of selected problems in the fields of chemistry, biochemistry, and forensic sciences. *Prereq.* One year of organic chemistry, basic physics, physical organic chemistry desirable but not essential.

**MHP 3101 Health Care Delivery 3 QH**

Explores the principal components of the health care delivery system with an emphasis on its social, political, and economic evolution and development. Discusses future trends and their implications.

**MHP 3102 Health Research Methodology 3 QH**

Covers aspects of experimental design and hypothesis testing. Uses critical reading of clinical trials, cohort and retrospective studies, and health services research articles to illustrate principles of research design and conduct. Students will be expected to complete a research protocol. *Prereq.* MHP 3101.

**MHP 3103 Professional Dynamics in Health Care 3 QH**

Examines skills and techniques used in developing leadership attributes, in creating change, and in working effectively with individuals and groups in the health care environment. Emphasizes differing, successful approaches for both leadership and interaction in the ambulatory, institutional, professional, legislative, and regulatory health care setting. *Prereq.* MHP 3101 and MHP 3102.

**MHP 3111 Operations Management in Health Care 3 QH**

Studies the application of systems analysis to health care institutions with particular attention to concepts for the management of ancillary services departments. Uses case studies to analyze work sampling, work flow, systems design, materials management, supply utilization, human resource management, and productivity improvements. Requires course project.

**MHP 3112 Financial Analysis in Health Care 3 QH**

Focuses on the application of financial analytic principles to health care institutions with particular attention to concepts for the management of ancillary services departments. Uses case studies and hospital financial reports to develop such techniques as cost accounting and budgeting. Emphasizes practical use of financial techniques for analyzing alternatives and decision making, as well as functional knowledge of financial management in health care. *Prereq.* MHP 3111.

**MHP 3200 Fundamentals of Regulatory Risk Assessment 3 QH**

Applies toxicologic, statistical, and pharmacokinetic principles to assessing the impact on health of hazardous exposure to chemical carcinogens and noncarcinogens found in the environment. Focuses on mathematical methods for quantitative risk assessment, exposure assessment, and risk characterization. Includes lab exercises and term paper assignments for in depth review of the key processes in risk assessment. Uses major risk assessments as examples such as dioxin, ozone, benzene, and ethylene dibromide.

**MHP 3201 Biometrics 2 QH**

Explores the fundamental principles of experimental design and statistical analysis, emphasizing biomedical research. Topics include descriptive statistics, hypothesis testing, correlation, regression, and chi-square test.

**MHP 3221 Health Science Education 1 3 QH**

Offers an overview of various aspects of education in the health-related professions, including design and use of behavioral objectives, evaluation tools (both clinical and didactic), and a survey of various teaching methods. Discusses current journal literature.

**MHP 3222 Health Science Education 2 3 QH**

Examines various packages of self-instructional aids. With the aid of lecture material and independent assignments, each student will design and produce a fifteen-minute autotutorial and will present it to the class for critique. Current journal literature will also be used.

**MHP 3401 Health Policy Analysis and Evaluation 3 QH**

Presents the application of analytic techniques (for example, decision analysis, benefit-cost analysis, cost-effectiveness analysis) to the forming, implementing, and evaluating of health policies and health care programs. Analysis of past and present studies in allocation of health care resources will examine the analytic as well as the political basis for decisions. Students critique published case analyses in class.



A written analysis of a future proposal or current program is required. *Prereq.* MHP 3101, MHP 3102, or equiv.

**MHP 3402 Health Policy Seminar 1** 1 QH  
Analyzes a selected topic from health policy literature. Students will be expected to evaluate and critique published articles and lead a seminar session. *Prereq.* MHP 3101 and MHP 3102.

**MHP 3403 Health Policy Seminar 2** 1 QH  
Continues MHP 3402.

**MHP 3404 Health Policy Seminar 3** 1 QH  
Continues MHP 3403.

**MHP 3801 MHP Thesis** 2 QH  
Student may register three times for a total of 6 QH of credit. *Prereq.* Written permission.

**MHP 3802 MHP Research Report** 2 QH  
Student may register for this course three times for a total of 6 quarter hours of credit. *Prereq.* Written permission.

**MHP 3810 MHP Directed Study** 3 QH  
Offers directed research in health studies. Research and study under the direction of a faculty member. *Prereq.* Written permission.

**MLS 3301 Functions of the Human Systems** 2 QH  
Examines physiology of the nervous, endocrine, muscular, cardiovascular, respiratory, urogenital, and digestive systems. *Prereq.* Chemistry and biology.

**MLS 3302 Pathophysiology 1** 2 QH  
Considers disease processes as appropriate and inappropriate variants of normal physiological functions. Examines certain important and illustrative diseases rather than a survey or catalog of diseases in general. *Prereq.* Mammalian physiology; knowledge of biochemistry is helpful.

**MLS 3303 Pathophysiology 2** 2 QH  
Continues MLS 3302. *Prereq.* MLS 3302.

**MLS 3304 Cellular Pathology** 3 QH  
Investigates cell aging and cell death mechanisms; reactions of cells to injury; the effects of ischemia, oxides of nitrogen, ozone, carbon tetrachloride, mercury, cadmium; immune injury; and theories of carcinogenesis. Lectures are based on recent review and current research articles. *Prereq.* Chemistry, biology, biochemistry, and cell biology helpful.

**MLS 3310 Principles of Medical Endocrinology** 2 QH  
Studies endocrine-related clinical abnormalities emphasizing the relationship of clinical lab measurement to biochemical dysfunctions of the endocrine system. *Prereq.* Biochemistry.

**MLS 3313 AIDS** 2 QH  
Offers an exploration of clinical, immunological, virological, epidemiological, and social facets of AIDS. Includes an introductory exposition of the present state of the disease and several sessions critically dissecting the pertinent literature.

**MLS 3321 Hematology 1—Disorders of the Erythrocytes** 2 QH  
Examines the physiology and pathology of red blood cells and hemoglobin. *Prereq.* Some knowledge of basic hematology is essential, and familiarity with general mammalian biochemistry is strongly recommended.

**MLS 3322 Hematology 2—Disorders of the Leukocytes** 2 QH  
Explores the pathophysiology of white cell disorders. Discusses clinical and lab correlations of leukemias, myeloproliferative, and lymphoproliferative disorders, infections, and inherited leukocyte anomalies. *Prereq.* Undergraduate biochemistry.

**MLS 3323 Hematology 3—Hemostasis** 2 QH  
Presents clinical and lab correlations of hemostatic disorders. Covers material from the basic to the most recent experimentation, technical, and clinical applications. *Prereq.* Undergraduate biochemistry, hematology course, or experience.

**MLS 3331 Genetic and Immunologic Aspects of Blood Group Identification** 1 QH  
Offers lectures dealing with immune response, physical chemistry of immunohematological tests, immunological diseases, tests for detection and identification of antibodies and antigens, principles of human genetics, blood group genetics, and population and family studies. Conducted at the New England Deaconess Hospital Blood Bank Training Center. *Prereq.* MLS 1631 and permission of instructor.

**MLS 3332 Principles and Foundations of the Blood Group Systems** 2 QH  
Presents lectures and experience with the human blood group systems, their antigens and antibodies, genetic inheritance and interactions, frequencies, mutants and alterations by disease states, and blood group testing. Conducted at the New England Deaconess Hospital Blood Bank Training Center. *Prereq.* MLS 3331, MLS 3531, and permission of instructor.

**MLS 3333 Design and Problems of Compatibility Testing** 1 QH  
Includes lectures and experience with the design and purpose of compatibility testing; factors complicating compatibility procedure; techniques employed in compatibility testing; leukocyte, platelet, and tissue compatibility; and special crossmatch and transfusion procedures. Conducted at the New England Deaconess Hospital Blood Bank Training Center. *Prereq.* MLS 3331, MLS 3531, MLS 3332, MLS 3532, and permission of instructor.

**MLS 3334 Principles of Hematology and Coagulation Related to Transfusion** 3 QH  
Offers lectures and lab experience related to hemoglobins; iron metabolism; blood formation; blood volume functions of circulating cells; anemias; leukemias and lymphomas; coagulation theories, factors, and disorders. Conducted at the New England Deaconess Hospital Blood Bank Training Center. *Prereq.* Permission of instructor.

**MLS 3335 Transfusion Therapy 2 QH**

Presents lectures discussing the selection of blood donors, phlebotomy and pheresis procedures, processing requirements, donor reaction, blood components, and physical characteristics of stored blood. Topics include indications for transfusion, transfusion reaction, therapeutic phlebotomy and pheresis, autologous transfusions, pediatric transfusions, massive blood replacement, extracorporeal perfusion, cardiopulmonary bypass, and dialysis. Conducted at the New England Deaconess Hospital Blood Bank Training Center. *Prereq.* *MLS 1631 and permission of instructor.*

**MLS 3336 Immunohematology Administration 2 QH**

Offers lectures and experience dealing with standards for blood banks and transfusion services (federal, state, AABB); requirements for state, FDA, and NIH (BOB) licensing; the American Blood Commission; and inspection and accreditation donor procurement. Considers interbank blood exchange; organization of blood bank and transfusion service; medical and legal aspects of transfusion practice; design of physical facilities; and evaluation, selection, and maintenance of equipment. Other topics include evaluation and selection of supplies and reagents; preparation; labeling requirements; quality control systems; proficiency testing programs; record keeping; computer principles; use of computer facilities; and operations of donor facilities and blood bank labs. Conducted at the New England Deaconess Hospital Blood Bank Training Center. *Prereq.* *MLS 1631 and permission of instructor.*

**MLS 3338 Immunobiology 2 QH**

Presents topics of current interest in immunobiology, such as cell interactions in the immune response, the major histocompatibility complex, antibody structure and function and the regulation of the immune response. *Prereq.* *Permission of instructor.*

**MLS 3339 Immunopathology 2 QH**

Presents the basic elements of immunopathology. Reviews the components and function of the immune system. Covers the disorders of the complement system, the biologic mechanisms of immunologically induced tissue injury (hypersensitivity reactions), autoimmunity, and immunodeficiency. Considers the immunological features of cancer and transplant rejection. *Prereq.* *MLS 3338.*

**MLS 3341 Medical Bacteriology 3 QH**

Focuses on those aspects of clinical bacteriology that are of significance in understanding the interaction among the infecting organism, the host and host defenses that affect symptoms, diagnosis, and chemotherapy of bacterial disease. *Prereq.* *Undergraduate microbiology.*

**MLS 3342 Current Topics in Microbiology 3 QH**

Emphasizes current topics in infectious diseases. Discusses topics in microbiology that are of medical and epidemiological interest during the time the course is being offered. *Prereq.* *Undergraduate microbiology and immunology.*

**MLS 3343 Medical Virology 3 QH**

Focuses on those aspects of clinical virology that are significant in understanding the interaction among infecting viruses, the host and host defenses that affect symptoms, diagnosis, and therapy of viral disease. *Prereq.* *Undergraduate microbiology and immunology.*

**MLS 3345 Epidemiology 2 QH**

Studies the basic concepts of epidemiology, causes of disease, factors contributed by agents, the human host, and the environment. Examines the acquisition and evaluation of data, as well as the relationship of person, time, and place. Reviews case studies and problems, including diet and cancer, causes of heart disease, and a review of the AIDS epidemic. *Prereq.* *Permission of instructor.*

**MLS 3351 Interpretive Clinical Chemistry 2 QH**

Presents the basic concepts in lab investigations; diagnostic enzymology, immunology, and clinical toxicology; organ system diseases; metabolic diseases; and special topics such as pediatric clinical biochemistry and cancer-associated biochemical abnormalities. *Prereq.* *INT 3101, INT 3102, INT 3103, undergraduate clinical chemistry, analytical and organic chemistry, and medical physiology.*

**MLS 3352 Clinical Chemistry Techniques and Instrumentation 2 QH**

Discusses the current analytical techniques and instrumentation used in clinical and research labs. Emphasizes developing a thorough understanding of the principles of these techniques and instrumentation. Covers applications to specific analyses and instrument troubleshooting. *Prereq.* *INT 3101, INT 3102, INT 3103, MLS 3354 undergraduate clinical chemistry, analytical and organic chemistry, and medical physiology.*

**MLS 3353 Clinical Chemistry Quality Assurance 2 QH**

Discusses statistical procedures; establishing and using reference ranges; analyzing goals and clinical relevance of lab procedures; evaluating methods; quality assurance; and sources of biological variation. *Prereq.* *MLS 3352 and biostatistics.*

**MLS 3354 Biomedical Analysis 2 QH**

Presents the modern reagents and techniques important in purifying and detecting biomolecules. Examples of reagents are radioisotopes, lumiphores, fluorophores, enzymes, electrophores, monoclonal antibodies, DNA probes, protein A, avidin-biotin, and detergents. Examples of techniques are chromatography, including GC and HPLC, radioenzymatic assays, 2D-electrophoresis, immunoassays, blotting assays, and mass spectrometry. *Prereq.* *INT 3101, INT 3102, and INT 3103.*

**MLS 3355, MLS 3356 Seminar and Report in Clinical Chemistry 1, 2 2 QH each**

Offers reports and discussions of current journal articles in clinical chemistry. *Prereq.* *PMC 3301.*



<b>MLS 3365 Medical Laboratory Management 1</b>	<b>3 QH</b>	Provides an opportunity for medical technologists to prepare themselves for managerial responsibilities. Introduces the basic skills and knowledge appropriate to the administration of a medical lab rather than specialized functional techniques. The basic objectives of the concentration are: to confront the student with appropriate learning experiences; to increase skills and knowledge in basic disciplines underlying administrative practice; and to develop judgment and skills in problem analysis and decision making in organizations. Discusses supervision, operations, organizations, productivity, human behavior, communications, and personnel management. <i>Prereq. Medical lab experience or permission of instructor.</i>
<b>MLS 3531 Genetic and Immunologic Aspects of Blood Group Identification Laboratory</b>	<b>1 QH</b>	Offers lab experience with immune response, physical chemistry of immunohematological tests, immunological diseases, tests for detection and identification of antibodies and antigens, principles of human genetics, blood group genetics, and population and family studies. Conducted at the New England Deaconess Hospital Blood Bank Training Center. <i>Prereq. MLS 1631 and permission of instructor.</i>
<b>MLS 3532 Principles and Foundations of the Blood Group Systems Laboratory</b>	<b>2 QH</b>	Offers lab experience with human blood systems, antigens and antibodies, genetic inheritance and interactions, frequencies, mutants and alterations by disease states, and blood group testing. Conducted at the New Deaconess Hospital Blood Bank Training Center. <i>Prereq. MLS 3331, MLS 3531, and permission of instructor.</i>
<b>MLS 3533 Design and Problems of Compatibility Testing Laboratory</b>	<b>2 QH</b>	Presents lab experience with the design and purpose of compatibility testing; factors complicating compatibility procedures; techniques employed in compatibility testing; leukocyte, platelet and tissue compatibility; and special crossmatch and transfusion procedures. Conducted at the New England Deaconess Hospital Blood Bank Training Center. <i>Prereq. MLS 3331, MLS 3531, MLS 3332, MLS 3532, and permission of instructor.</i>
<b>MLS 3535 Transfusion Therapy Laboratory</b>	<b>2 QH</b>	Provides lab experience with selection of blood donors, phlebotomy and pheresis procedures, processing requirements, donor reaction, blood components, and physical characteristics of stored blood. Topics include indications for transfusion, transfusion reactions, therapeutic phlebotomy and pheresis, autologous transfusions, cardiopulmonary bypass, and dialysis. Conducted at the New England Deaconess Hospital Blood Bank Training Center. <i>Prereq. MLS 1631 and permission of instructor.</i>
<b>MLS 3536 Immunohematology Administration Laboratory</b>	<b>2 QH</b>	Offers lab experience with standards for blood banks and transfusion services (federal, state, AABB); requirements for state, FDA, and NIH (BOB) licensing; the American Blood Commission; inspection and accreditation donor procurement; and interbank blood exchange. Topics include organization of blood bank and transfusion service; medical and legal aspects of transfusion practice; design and physical facilities; evaluation, selection, and maintenance of equipment; evaluation and selection of supplies and reagents; preparation; labeling requirements; quality control systems; proficiency testing programs; record keeping; computer principles, and the use of computer facilities; operations of donor facilities; and blood bank labs. Conducted at the New England Deaconess Hospital Blood Bank Training Center. <i>Prereq. MLS 1631 and permission of instructor.</i>
<b>MLS 3538 Immunobiology Laboratory</b>	<b>2 QH</b>	Students are required to undertake individual research projects relating to topics covered in lecture.
<b>MLS 3602 Blood Banking—MLS Seminar</b>	<b>1 QH</b>	Revolving topics.
<b>MLS 3603 Clinical Chemistry—MLS Seminar</b>	<b>1 QH</b>	Discusses current research.
<b>MLS 3604 Hematology—MLS Seminar</b>	<b>1 QH</b>	Revolving topics.
<b>MLS 3605 Immunology—MLS Seminar</b>	<b>1 QH</b>	Revolving topics.
<b>MLS 3606 Management—MLS Seminar</b>	<b>1 QH</b>	Revolving topics.
<b>MLS 3607 Microbiology—MLS Seminar</b>	<b>1 QH</b>	Revolving topics.
<b>MLS 3608 Education—MLS Seminar</b>	<b>1 QH</b>	Revolving topics. <i>Prereq. MLS 3221 and MLS 3222, or permission.</i>
<b>MLS 3609 Immunohematology—MLS Seminar</b>	<b>1 QH</b>	Revolving topics.
<b>MLS 3801 Graduate Research Report 1</b>	<b>2 QH</b>	Studies a special topic in medical lab science, involving individual research, undertaken and reported under the direction of a faculty member. <i>Prereq. Written permission of instructor.</i>
<b>MLS 3802 Graduate Research Report 2</b>	<b>2 QH</b>	Students may register twice (4 QH). Continues MLS 3801. <i>Prereq. MLS 3801.</i>
<b>MLS 3821 MLS Thesis</b>	<b>2 QH</b>	Involves analytical or experimental work conducted under the auspices of the department. Students may register three times (6 QH). <i>Prereq. Written permission of instructor.</i>
<b>PAH 3101 Principles of Medicine 1</b>	<b>6 QH</b>	Offers an intensive, three quarter, organ-system based sequence encompassing anatomy, physiology, pathophysiology, and therapy of disease. (This course

is the major component of the second-year curriculum of the Tufts School of Medicine and meets for approximately eighteen hours per week). *Prereq.* Admission to PharmD Program.

**PAH 3102 Principles of Medicine 2** 6 QH  
Continues PAH3101. *Prereq.* PAH 3101.

**PAH 3103 Principles of Medicine 3** 6 QH  
Continues PAH3102. *Prereq.* PAH 3102.

**PAH 3201 Drug Literature Evaluation** 2 QH  
Examines the principles and practice of drug information, literature retrieval, and evaluation of the pharmacy and medical literature. *Prereq.* Admission to PharmD Program.

**PAH 3211, PAH 3212, PAH 3213** 2 QH each  
**Pharmacotherapeutics 1, 2, 3**  
Offers a three quarter sequence in advanced contemporary therapeutics of disease. Topics parallel material presented in the principles of medicine sequence. *Prereq.* Admission to PharmD Program.

**PAH 3221 Psychosocial Aspects of Health Care Seminar** 1 QH  
Studies psychological and social concerns that determine patient behavior and impact on health care. *Prereq.* Admission to PharmD Program.

**PAH 3231 Pharmacokinetics in Drug Therapy** 3 QH  
Examines the application of clinical pharmacokinetic information and techniques to patient care. Discusses the strategies of therapeutic drug monitoring for various drug categories and the use of decision analytic techniques in pharmacokinetic consultations. *Prereq.* Admission to PharmD Program or permission of instructor.

**PAH 3311** 4 QH  
**PAH 3312, PAH 3313, PAH 3314** 5 QH each  
**Clerkship 1, 2, 3, 4**  
Offers a four quarter sequence of advanced clinical clerkship rotations in patient care at various affiliated clinical sites. Students participate in "rounding" activities with medical and other health professionals and have the opportunity to provide drug information in the therapeutic decision-making process. The emphasis in these rotations is on helping students develop skills and familiarity with the application of drugs in the clinical setting as well as the usual progression of disease. Rotations include internal medicine, ambulatory care, and elective experiences. Involves approximately forty hours per week. *Prereq.* Admission to PharmD Program.

**PAH 3321 Patient Assessment** 2 QH  
Explores the general principles of history taking and physical examination. Focuses on organ systems of particular importance to the clinical pharmacist in monitoring drug response. *Prereq.* Admission to PharmD Program.

**PAH 3601, PAH 3602 Seminar 1, 2** 1 QH each  
Offers a two quarter sequence covering topics of relevance to the clinical pharmacy practitioner. Principles of effective communication and teaching are

discussed. Students are expected to make oral presentations covering various therapeutic and related subjects as well as the progress of their investigational projects. *Prereq.* Admission to the PharmD Program.

**PAH 3643 Biomedical Science Research Report 1** 2 QH  
Requires students to present and participate in research group-related seminars, the format of which will be determined by students' advisers. *Prereq.* Doctoral students only.

**PAH 3644 Biomedical Science Research Report 2** 2 QH  
Continues PAH3643. *Prereq.* PAH 3643.

**PAH 3645 Biomedical Science Research Report 3** 2 QH  
Continues PAH3644. *Prereq.* PAH 3644.

**PAH 3646 Biomedical Science Research Report 4** 2 QH  
Continues PAH3645. *Prereq.* PAH 3645.

**PAH 3647 Biomedical Science Research Report 5** 2 QH  
Continues PAH3646. *Prereq.* PAH 3646.

**PAH 3648 Colloquium Presentation** 1 QH  
Requires students to present one formal seminar on their research. This presentation will be open to all those interested. *Prereq.* Doctoral students only.

**PAH 3701 Human Nutrition** 3 QH  
Studies nutrients considered essential for optimal human nutrition. Examines the digestion, absorption, metabolism, and excretion of each nutrient. Discusses food sources recommended, intakes for normal individuals, deficiency, and toxicity syndrome of public health interest.

**PAH 3705 Nutrition Seminar** 1 QH  
Aids the student in developing critical thinking regarding nutrition issues that are important to today's consumer. Introduces the student to a variety of readings that present varying viewpoints about nutrition issues and discusses these issues.

**PAH 3707 Experimental Design and Biometrics** 3 QH  
Discusses fundamental principles of experimental design and statistical analysis, with particular emphasis on clinical research. Topics include descriptive statistics, hypothesis testing, analysis of variance, correlation, regression, chi-square test, and nonparametric methods.

**PAH 3731 New Computers for Health Care** 3 QH  
Introduces computer applications and management of computer applications in health care. Applies the principles of information flow or clinical patient data to the information system lifecycle, emphasizing systems analysis process applied to health care application selection, implementation, evaluation, and monitoring. Analyzes representative applications in different health care disciplines and stresses the manager's role.

**PAH 3799 Dissertation Continuation** 0 QH  
Continues PAH3813. *Prereq.* PAH 3813 must be taken three times before registering for this course.

**PAH 3801 Investigational Project** 2 QH each  
Offers the opportunity to demonstrate the ability to identify a problem within the domain of clinical



pharmacy, formulate a hypothesis, develop methods to collect and interpret the data in order to test the hypothesis, and report the investigation in writing using a thesis format. (Note "Investigational Component of PharmD Program.") *Prereq.* Admission to PharmD Program.

**PAH 3804 Investigational Project Continuation** 1 QH  
*Prereq.* PAH 3801.

**PAH 3805 Independent Study PharmD** 3 QH  
*Prereq.* Written permission of instructor.

**PAH 3813 Dissertation** 3 QH  
*Prereq.* Written consent.

**PCL 3101 Concepts in Pharmacology** 2 QH  
Offers in-depth coverage of the fundamental principles of pharmacology. Covers pharmacodynamics, including dose-effect relationships and drug-receptor interactions. Presents pharmacokinetic concepts, including absorption, distribution, and elimination as well as common pathways of drug metabolism. Other topics include pharmacogenetics, drug resistance, tolerance, and physical dependence. Provides an overview of the drug discovery and development process. The course is a necessary prerequisite for succeeding courses in pharmacology and toxicology. *Prereq.* Admission to a graduate department or permission of the instructor.

**PCL 3121 Experimental Pharmacology** 2 QH  
Offers a lab experience with experimental pharmacology involving whole animal, isolated tissues, and drug receptors to demonstrate classical research methodologies. *Prereq.* PCL 3101, PCL 3153, and admission to Pharmacology or Toxicology programs, or permission of Pharmacology Program director.

**PCL 3131 Receptor Pharmacology** 2 QH  
Reviews receptors for drug substances and for endogenous ligands in a format that combines lecture presentations and discussion. Focuses on the evaluation of current literature. Covers techniques available to study receptors; various models for receptor-ligand interaction; stereochemical aspects of receptor interactions; receptor-mediated coupling mechanisms; and evaluation of several specific receptor systems. *Prereq.* MLS 3301, PCL 3101, INT 3101, INT 3102, INT 3103, or permission of instructor.

**PCL 3141 Pharmacology of Drug Dependence** 2 QH  
Surveys the major drug classes subject to misuse and addiction. Emphasizes general concepts of tolerance and dependence, the general pharmacology of prototypes of abused drugs, patterns and consequences of abuse in humans, and recent research advances. Examines selected research papers critically to stimulate quantitative pharmacologic thinking. *Prereq.* PCL 3101.

**PCL 3153 Pharmacological Basis of Therapeutics 1** 2 QH  
Surveys the chemical and pharmacological basis of the major classes and characteristics of a prototype drug from each class. Characteristics studied include indications, adverse reactions, contraindications, structure-activity relationships, metabolism,

mechanisms of action, and clinically significant interactions. Reading assignments cover animal models relevant to therapeutic screening and/or testing and the appropriate design of clinical trials. *Prereq.* PCL 3101.

**PCL 3154 Pharmacological Basis of Therapeutics 2** 2 QH  
Continues PCL 3153. *Prereq.* PCL 3153.

**PCL 3155 Pharmacological Basis of Therapeutics 3** 2 QH  
Continues PCL 3154. *Prereq.* PCL 3154.

**PCL 3301 Pathology** 2 QH  
Introduces the study of the nature of disease, emphasizing the general mechanisms and pathogenesis. Of paramount importance is the effect of disease on the human body. The language of disease is stressed. Basic principles of disease processes and more common special diseases are extensively covered. A research paper may be assigned at the discretion of the instructor. *Prereq.* anatomy and physiology.

**PCL 3601 Pharmacology Seminar** 1 QH  
Provides the opportunity for students to gain experience in oral and written presentation and in interpreting pharmacological data. Offers topics from current pharmacology literature selected by participants. *Prereq.* PCL 3101.

**PCL 3801 Pharmacologic Methods 1** 3 QH  
Students carry out experiments in the lab of a pharmacology or toxicology faculty member. The experiments serve to demonstrate the techniques utilized in that lab to study a pharmacologic question. *Prereq.* PhD students only.

**PCL 3802 Pharmacologic Methods 2** 3 QH  
Continues PCL 3801. *Prereq.* PCL 3801.

**PCL 3811 Research Report in Pharmacology 1** 2 QH  
Offers a selected research project undertaken by the student under the direction of a faculty member. *Prereq.* PCL 3101.

**PCL 3812 Research Report in Pharmacology 2** 2 QH  
Continues PCL 3811. *Prereq.* PCL 3811.

**PCL 3821 Pharmacology Thesis** 2 QH  
Students may register three times (6 QH). *Prereq.* Written permission from program director.

**PCT 3101 Introduction to Biopharmaceutics and Pharmacokinetics** 3 QH  
Offers the opportunity to students to remedy deficiencies in biopharmaceutics and pharmacokinetics. Topics include general concepts of one and two compartment models; linear and nonlinear pharmacokinetics; drug kinetics after intravenous, intramuscular, or oral administration; practical methods of compartmental models utilizing plasma and/or urinary data; multiple dosing kinetics; bioavailability and bioequivalence of drug products; and effect of renal impairment on drug kinetics. *Prereq.* Permission of instructor.

**PCT 3111 Clinical Pharmacokinetics** 2 QH  
Focuses on applying various pharmacokinetic techniques to estimating dosage regimens, evaluating



drug therapy, consulting on drug selection, and assessing bioavailability and bioequivalence data. *Prereq.* A background in biopharmaceutics or permission of instructor.

**PCT 3112 Pharmacokinetics 3 QH**

Acquaints graduate students with the theoretical compartmental analysis in pharmacokinetics. Topics include derivation and treatment of general equations for linear and nonlinear mammillary models. Uses of Laplace transform, transfer functions, general partial fraction theorem, and input-disposition functions in pharmacokinetics. Emphasizes practical methods used to kinetically analyze the absorption, distribution, and elimination of drugs. Explores computer methods, physiological models, and stochastic compartmental systems. *Prereq.* MTH 1245, MTH 1246, graduate standing, and permission of instructor.

**PCT 3161 Drug Metabolism 2 QH**

Presents the current principles and methods for studying the metabolic transformation and physiological disposition of drugs and other chemicals of pharmacological and toxicological interest. Covers the chemistry of Phase I and Phase II reactions from a mechanistic and empirical viewpoint. Assesses the role of structure, bonding, molecular configuration, substitution, and related physiochemical factors in the enzymatic reactions, as well as the effects of enzyme induction and other factors in the enzymatic reaction. Explores the effects of enzyme induction and other factors such as species, sex, and age on the extent of metabolism. *Prereq.* PCL 3010 or permission of instructor.

**PCT 3200 Advanced Pharmaceutics 2 QH**

Studies the theoretical principles of modern physical pharmacy. Emphasizes physical insight and mathematical rigour. Topics include application of basic principles of thermodynamics, colligative properties, colloidal systems, molecular and micellar association, surface chemistry, mass transport phenomena, and chemical stability of drugs. *Prereq.* PCT 1340, PCT 1350, or permission of instructor.

**PCT 3205 Novel Drug Delivery System 2 QH**

Conventional use of drugs in the treatment of prevention of disease can be hampered by their indiscriminate action, often leading to side effects. In addition, many drugs are unable to reach target areas in the body in effective concentrations, while others are prematurely excreted or inactivated. During the last decade there have been concerted attempts to circumvent such problems by the use of delivery systems that transport drugs safely to sites when they are needed, and facilitate and/or control their release. This class attempts an in-depth examination of the methodology and significance of these novel delivery systems. Topics include the following systems that are currently under investigation: nanoparticles, cellular vectors, microcapsules, microspheres, prodrugs, liposomes as drug carriers, polymeric systems, and macromolecular systems such as DNA, glycoproteins, monoclonal antibodies, and hormones. *Prereq.* PCT 3101, PCT 3200 or permission of instructor.

**PHP 3101 Hospital Pharmacy Administration 1 3 QH**

Studies management of a department's personnel and financial resources. Covers management skills, personnel administration and organization, as well as budget preparation, analysis, and control, and hospital reimbursement.

**PHP 3102 Hospital Pharmacy Administration 2 3 QH**

Presents an overview of hospital pharmacy services and an introduction of areas of the hospital that either require or relate to pharmacy services. Discusses hospital administration, materials management, quality assurance programs, committee responsibilities, and drug distribution systems, as is the development and writing of a proposal for new services.

**PHP 3121 Health Care Administration 1 3 QH**

Examines the socioeconomic and statistics of health care, including governmental programs, legislative trends, third-party insurance and welfare programs, and other areas that may affect the management of the modern institutional pharmacy. *Prereq.* Admission to the hospital pharmacy program or permission of instructor.

**PHP 3131 Computer Applications in Hospital Pharmacy 3 QH**

Reviews past, present, and future applications of computer systems in institutional practice. Covers management aspects of computer systems development and selection. Discusses microcomputers and departmental computers to support clinical and management practice.

**PHP 3141 Legal Aspects/Federal Legislation in Pharmacy 2 QH**

Analyzes the federal and state laws relating to the distribution of drugs in the institution. Topics include common-law liabilities such as malpractice and other frequently encountered problems. *Prereq.* Admission to hospital pharmacy program.

**PHP 3165 Special Topics in Hospital Pharmacy 2 QH**

Selected topics of interest to hospital pharmacy practitioners.

**PHP 3201 Clinical Pharmacy 3 QH**

Considers the patient-oriented aspects of the application of therapeutic agents to hospital patients. Studies the relation of therapeutic regimens to lab tests and drug interactions, as well as the role of the hospital pharmacist as an active member of the health-care team dealing directly with inpatients and outpatients. *Prereq.* Admission to hospital pharmacy program or permission of instructor.

**PHP 3211 Contemporary Therapeutics 1 3 QH**

Explores recent developments in current therapeutic approaches and their rationale in the treatment of cardiovascular, neurological, gastrointestinal, musculoskeletal, and metabolic diseases of a noninfectious nature. Discusses therapy related to aging and selected genetic diseases. *Prereq.* PHP 3201.

**PHP 3212 Contemporary Therapeutics 2 3 QH**

Examines current concepts of infectious diseases and the rationale for the chemotherapeutic treatment

of these conditions. Studies diseases of the blood and blood-forming organs, neoplastic disease, and diseases related to deficiency states. *Prereq.* PHP 3201.

**PHP 3231 Drug Monitoring 3 QH**

Presents the process by which drugs are monitored to determine their effectiveness, safety, prevention of iatrogenic factors, drug-drug interactions, and matters affecting patient compliance with a therapeutic regimen. Considers the utilization of this information in improving patient care. *Prereq.* Written permission.

**PHP 3241 Sterile Products 3 QH**

Studies theory principles, methods, and techniques in preparing sterile, pyrogen- and particulate-free products. Discusses equipment and lab design required for manufacturing different types of sterile products and the practical considerations essential for their production. *Prereq.* Permission of instructor.

**PHP 3601 Seminar on Hospital Pharmacy 3 QH**

Offers a seminar on current developments or specific problems in hospital pharmacy that have been studied in-depth by students with guidance from the graduate faculty. The student presentations may be alternated with guest speakers on topics of current interest. Student participation in the discussions is an essential objective of the course. *Prereq.* Admission to hospital pharmacy program.

**PHP 3801 Hospital Pharmacy Thesis 2 QH**

Students may register three times (6 QH). *Prereq.* Written permission of instructor.

**PMC 3101 Chemistry of CNS Depressants 3 QH**

Presents and discusses the chemistry, mechanism of action, and structure-activity relationships of general anesthetics, hypnotics and sedatives, anti-epileptics, analgesics, tranquilizers, and muscle relaxants. Considers the mechanics of drug design and methods of modification. *Prereq.* PMC 3105 or permission of instructor.

**PMC 3102 Chemistry of Autonomic Drugs 3 QH**

Discusses drug action on the central nervous system, emphasizing the action mechanism of the chemical mediators of the peripheral nervous system. Considers the role of the agents affecting this system—adrenergic and cholinergic and reversible and irreversible inhibitors of these systems—in relation to their chemical structure and biological activity. *Prereq.* PMC 3105 or permission of instructor.

**PMC 3103 Chemistry of Anti-Infectives 3 QH**

Studies the organic medicinal chemistry of various chemotherapeutic agents used to treat infectious diseases. Focuses on chemistry, mechanism of action, structure activity relationships, and recent research. Topics include antibacterials (sulfonamides, antifolates, and quinolones), antibiotics (beta-lactams, aminoglycosides, and tetracyclines), antivirals, and investigational drugs used in HIV infection therapy. *Prereq.* PMC 3105 and biochemistry or permission of instructor.

**PMC 3104 Biochemical and Pharmacological Principles of Cancer Chemotherapy 3 QH**

Presents recent developments in new approaches to the treatment of cancer, including alkylating agents, antimetabolites, hormones, miscellaneous compounds, and combinations of the above with radiation and immunology. Explores possible mechanisms of chemotherapeutic action. *Prereq.* PMC 3105 or permission of instructor.

**PMC 3105 Principles of Medicinal Chemistry 3 QH**

Presents fundamental chemical and stereochemical principles that account for properties of drugs and contribute to an understanding of drug action. Focuses on the physiochemical properties of functional groups as they relate to overall properties of drug molecules. Topics include delivery of drugs to the central nervous system in terms of lipophilicity/hydrophilicity, ionization potential and hydrogen-bonding capability; the interaction of drugs with neurotransmitter, hormonal, and neurohormonal systems; qualitative and quantitative structure activity relationships; drug biotransformation; and principles of and recent developments in drug design.

**PMC 3171 Heterocyclic Drugs in Medicinal Chemistry 3 QH**

Studies the application of the combined principles of medicinal and heterocyclic chemistry to the synthesis of pharmaceutically useful compounds. Emphasizes a critical evaluation of the literature methods with respect to synthesis and biological activity. *Prereq.* Advanced organic chemistry or permission of instructor.

**PMC 3511 Advanced Drug Synthesis 4 QH**

Presents the application of synthetic and analytical techniques to the preparation of biologically active compounds and their intermediates. Demonstrates the process of drug development from design to synthesis to final characterization. Includes laboratory documentation and report preparation.

**PMC 3601 Medicinal Chemistry Seminar 1 QH**

Reports and discussions involving current journal articles and research in medicinal chemistry. *Prereq.* PMC 3101.

**RSC 3201 Radiopharmaceutical Chemistry 3 QH**

Discusses the application of chemistry to the design and synthesis of radiodiagnostic agents. Presents the properties of the radionuclides and their biological carriers as they relate to their uses in nuclear medicine. *Prereq.* PMC 3105 or permission of instructor.

**RSC 3811 Radiopharmaceutical Chemistry Research Report 1 2 QH**

Provides the student with a selected research project related to radiopharmaceutical chemistry under the supervision of a faculty member. Involves a laboratory project or an extensive literature review of topic of current interest in the field.

**TOX 3101 Concepts in Toxicology 1 3 QH**

Presents the principles of toxicology from an organ system perspective. Focuses on the concepts used to evaluate toxicity; the mode of injury at the organ and



cellular level; and the basic subcellular mechanisms through which toxic agents produce damaging effects. Uses recent toxicological literature to introduce concepts for evaluating toxicity through data analysis.

**TOX 3102 Concepts in Toxicology 2 3 QH**

Continues TOX 3101. Emphasizes the interpretation of toxicological literature to evaluate the risk involved in exposure to prototype chemicals. Employs structure activity and biochemical methods of assessment to evaluate the toxicity of major classes of chemical compounds.

**TOX 3121 Environmental Toxicology 3 QH**

Discusses the distribution, interaction, and effects of toxic agents on the biosphere. Examines pollutants grouped by chemical and use characteristics including pesticides, food additives, metals, carcinogens, and teratogens. Addresses the action mechanism and selectivity basis of toxic agents. Applies the results of toxicologic investigation to understanding the environment's chemical pollution.

**TOX 3501 Biochemical Toxicology Laboratory 4 QH**

Introduces investigative methods for assessing toxicity. Develops the ability to analyze and interpret data generated in lab and in the literature, and sharpens technical report writing skills.

## Physician Assistant

*The Physician Assistant Program is a post-baccalaureate certificate program. Most of the courses are available to physician assistant students only. Other students interested in enrolling in physician assistant courses must have the permission of the Physician Assistant Program's director.*

**MLS 1109 Foundations of Medical Laboratory Science 4 QH**

Introduces basic lab methods employed in primary care, including urinalysis, gram staining, hematocrit, hemoglobin, sedimentation rate, white-cell count, and differential. Lab. *Prereq. PA students only.*

**PA 1120 Roles, Rules, and Resources for Physician Assistants 2 QH**

Examines the role of physician assistants, including the manner in which they interact with other health professionals, as well as the way in which their role is perceived by others. Provides an understanding of the law as it relates to physician assistants' actions and to help them develop the ability to make referrals to common community resources. *Prereq. PA students only.*

**PA 1125 Human Anatomy 2 QH**

Considers the basic structure of the human body, highlighting those features which are of clinical importance. Emphasizes the gastrointestinal, cardiovascular, respiratory, neurological, and musculoskeletal systems. *Prereq. PA students only.*

**PA 1133 Physical Diagnosis 1 5 QH**

Presents techniques for taking an accurate history and performing a physical examination as well as organizing the results for oral and written presentation. Includes discussion, demonstrations, and patient workups. *Prereq. PA students only.*

**PA 1134 Physical Diagnosis 2 5 QH**

Explores techniques of obtaining and presenting an accurate history; performing a competent and thorough physical examination; and synthesizing the results of the history, physical, and laboratory findings to arrive at an accurate evaluation of the patient. Uses discussion, demonstrations, and patient workups. *Prereq. PA students only.*

**PA 1138 Medical Physiology 1 4 QH**

Covers principles of gastrointestinal, respiratory, endocrine, and cardiovascular human physiology. *Prereq. PA students only.*

**PA 1140 Medical Physiology 2 2 QH**

Discusses principles of cardiovascular and renal physiology. *Prereq. PA students only.*

**PA 1321 Patient Education and Counseling 2 QH**

Provides an opportunity to acquire the knowledge necessary for educating and counseling patients. Demonstrates ways in which to evaluate patients' needs and readiness to learn, as well as the use of common teaching techniques for issues such as chronic disease management, ostomies, diabetes, heart disease, nutrition counseling, and sex education. *Prereq. PA students only.*

**PA 1322 Medical Care and Current Social Problems 2 QH**

Studies the principal components of the health care delivery system, with emphasis on services, organization, and funding. Uses selected social problems to demonstrate the operation of the medical care system. *Prereq. PA students only.*

**PA 1323 Principles and Concepts of Emergency Medicine 3 QH**

Introduces the principles of life-support techniques. Focuses on the initial management of acute medical and traumatic conditions in hospital and prehospital situations. Students are instructed in basic cardiopulmonary resuscitation techniques. *Prereq. PA students only.*

**PA 1335 Principles of Interviewing 2 QH**

Examines various methods of interviewing patients. Focuses on establishing a relationship and understanding the effects of cultural background and psychosocial problems on the patient's response to illness and death and dying. *Prereq. PA students only.*

**PA 1336 Pathophysiology and Medicine 1 3 QH**

Presents a systems approach to the principles of disease processes in people. Topics include physiology, pathophysiology, the natural history of disease, diagnostic procedure, and therapeutic measures. Hematology and cardiology problems are usually covered. *Prereq. PA students only.*

**PA 1337 Pathophysiology and Medicine 2 3 QH**

Continues PA 1336. Covers topics that may include pulmonary, infectious disease, gastrointestinal, and endocrine problems. *Prereq. PA students only.*

**PA 1338 Pathophysiology and Medicine 3 3 QH**

Continues PA 1337. Topics may include renal, rheumatology, oncology, and primary care problems. *Prereq. PA students only.*

**PA 1340 Introduction to Clinical Rotations 4 QH**

Offers clinical rotations, expectations, and requirements for students about to enter their clinical year. Some review of history taking and physical examination skills is conducted, and students are instructed in various clinical procedures. *Prereq. PA students only.*

**PA 1341 Applied Study in Emergency Medicine 4 QH**

During this rotation, the student has the opportunity to become familiar with the problems encountered in an emergency room. The student is responsible for taking medical histories and performing physical examinations on acute as well as nonemergent patients and presenting these to the medical preceptor. When appropriate, the necessary diagnostic and therapeutic measures are performed. Through didactic sessions at the clinical site as well as clinical training, the student may also be exposed to the emergency management and treatment of conditions such as trauma, shock, burns, asthma, poisoning, allergic reactions, seizures, and respiratory failure. *Prereq. Successful completion of first year of Physician Assistant Program.*

**PA 1342 Applied Study in Medicine 4 QH**

Offers the student opportunity to take and record histories and perform physical examinations during in-hospital rotation. Provides the opportunity to become versed in the assessing and managing a variety of medical problems by attending medical rounds and conferences, performing diagnostic procedures, presenting case write-ups, recording progress notes, and working under the supervision of a doctor of medicine. Emphasis is placed on the skills of collecting, assessing, and presenting patient data for physician review; ordering appropriate laboratory and diagnostic studies; counseling patients in therapeutic procedures; and helping to coordinate the contributions of other health professionals in the management of the patient. *Prereq. Successful completion of first year of Physician Assistant Program.*

**PA 1343 Applied Study in Pediatrics 4 QH**

During the pediatric rotation, the student may develop familiarity with outpatient pediatric problems through training in clinics and private pediatric offices. Emphasis during this training is on caring for the child from birth through adolescence. Students

are given the opportunity to take histories and perform pediatric physical examinations. Diagnosis and management of common childhood illnesses and evaluation of the variations of growth and development are also stressed. Students have the opportunity to develop skills with which to counsel parents on immunizations, child visits, parameters of growth and development, common psychosocial problems, nutrition, and accident and poisoning prevention. Students may also have the chance to learn how to administer immunizations and do audio and visual screening. *Prereq. Successful completion of first year of Physician Assistant Program.*

**PA 1344 Applied Study in Mental Health 4 QH**

Offers exposure to a wide variety of psychiatric problems. Clinical settings include wards, clinics, and multiservice centers. Students are expected to perform mental status exams and to do cognitive testing. Emphasis is on recognizing various types of psychiatric problems that require referral to a specialist and managing those problems that can be handled by the nonspecialists. Assists students in furthering their understanding of effective patient interactions and the psychiatric components of health, disease, and disability. *Prereq. Successful completion of first year of Physician Assistant Program.*

**PA 1345 Applied Study in Obstetrics and Gynecology 4 QH**

Provides students the opportunity to become involved with obstetric and gynecological services provided by teaching hospitals in the Boston area. Emphasizes pre- and post-natal care, monitoring a woman in labor, assisting in deliveries, and developing the skill necessary to deliver a child in an emergency situation. Students have the opportunity to take obstetrical histories and perform obstetrical examinations. While rotating through gynecology, the student is expected to learn how to assess and manage a variety of common gynecological problems and to counsel patients on family planning. *Prereq. Successful completion of first year of Physician Assistant Program.*

**PA 1346 Applied Study in Ambulatory Medicine 1 4 QH**

Offers exposure to aspects of general medical and family practice with emphasis placed on personalized care of healthy and sick patients. Patient education, counseling, and integration of community services, as well as medical diagnosis and management, are considered a major part of this rotation. *Prereq. Successful completion of first year of Physician Assistant Program.*

**PA 1348 Principles of Orthopedics 3 QH**

Discusses common orthopedic problems, including those of the hand, knee, shoulder, and back. Examines special problems of acute trauma and the management of uncomplicated orthopedic cases. Additional topics may include techniques of completing an adequate patient history and physical examination of the orthopedic patient. *Prereq. PA students only.*



**PA 1353 Principles of Pediatrics** 3 QH  
Examines physiological and psychological fundamentals of child development. Focuses on the major common pediatric illnesses, their signs, symptoms, and treatment regimens; various types of medications used in pediatrics, their indication and dosage in relation to specific disorders; and the management of pediatric emergencies such as cardiac arrest, anaphylaxis, convulsions, coma, and high fevers. *Prereq. PA students only.*

**PA 1354 Principles of Psychiatry** 3 QH  
Offers an opportunity to understand how to work with patients and families exhibiting psychiatric problems. Topics include psychological growth and development, the effect of social milieu on behavior, the psychological bases of drug and alcohol abuse, and the dynamics of psychosomatic problems. *Prereq. PA students only.*

**PA 1355 Principles and Concepts of Surgical Intervention in Disease Processes** 3 QH  
Studies major and minor surgical conditions, with an emphasis on indications for surgical intervention and pre- and post-operative management in both the ambulatory and inpatient settings. *Prereq. PA students only.*

**PA 1356 Basic Diagnostic Radiology** 2 QH  
Introduces the underlying principles, use, and interpretation of radiographs pertinent to primary care medicine. *Prereq. PA students only.*

**PA 1358 Medical Therapeutics** 3 QH  
A case-study format that involves students in planning the management of common disease states. Used to help students understand the clinical use of common therapeutic agents. *Prereq. PA students only.*

**PA 1359 Applied Study in Surgery** 4 QH  
During this rotation students participate in a variety of surgical patient care responsibilities under the supervision of a surgical resident and/or staff surgeon. The rotation emphasizes general surgery, but the students have an opportunity for varying exposure to other surgical specialties and sub-specialties. Students assist in the initial assessment of the surgical patient, including obtaining an accurate medical history and performing a physical examination. As members of the surgical team, the students are involved in pre-operative management, including patient education and any procedures necessary to prepare the patient for surgery. Students assist the surgeon in the operation room when appropriate and have the opportunity to become familiar with operating room procedures and equipment. Students are also involved in the post-operative evaluation and management of the patient. Students will have the opportunity to attend surgical grand rounds and other surgically oriented educational meetings when available at their rotation sites. *Prereq. Successful completion of first year of Physician Assistant Program.*

**PA 1360 Applied Study in Ambulatory Medicine 2** 4 QH  
During this rotation the students participate in providing health care to the adult outpatient under the supervision of a physician specialist in internal medicine. The students will have the opportunity to become involved in the initial assessment and management of adults with a medical complaint as well as the ongoing assessment and management of patients with established diagnoses. It is anticipated that the student will be exposed to many of the common problems encountered in medical practice, such as hypertension, diabetes, and heart disease. The emphasis is on the assessment and management of both acute and chronic medical problems. *Prereq. Successful completion of first year of Physician Assistant Program.*

**PA 1361 Applied Study Elective** 4 QH  
Offers additional exposure to an area of clinical medicine in which the student has a special interest. Student may choose additional experience in an area covered by required rotations or select a subspecialty such as dermatology, orthopedics, cardiology, geriatrics, etc. All elective rotations are reviewed and must be approved by the clinical coordinator. *Prereq. Successful completion of first year of Physician Assistant Program.*

**PA 1362 Principles of Obstetrics** 2 QH  
Discusses the physiologic changes in pregnancy with nutrition, prenatal care, medical complications, and surgical complications of pregnancy, labor, and delivery. Also covers managing pre- and post-natal periods and diagnosing and treating sexually transmitted diseases. *Prereq. PA students only.*

**PA 1363 Principles of Gynecology** 2 QH  
Studies the anatomy and physiology of the human reproductive system, the methods and effectiveness of contraception, and any contraindications. Also explores the medical indications for abortion and the appropriateness of the various methods of pregnancy termination. Emphasizes the causes, signs, and treatments of common gynecological problems, including the significance of early cancer detection. *Prereq. PA students only.*

**PA 1364 Medical Anatomy and Physiology 1** 4 QH  
Considers the basic structure of the human body, highlighting those of clinical importance. Covers the musculoskeletal, neurologic, cardiovascular, and respiratory systems. *Prereq. PA students only.*

**PA 1365 Medical Anatomy and Physiology 2** 4 QH  
Continues PA 1364. Discusses the gastrointestinal, endocrine, and renal systems. *Prereq. PA students only.*

**PA 3101 Clinical Neurology** 4 QH  
Presents the clinical application of neuroanatomy and neurophysiology. Offers the opportunity to develop an understanding of the normal functioning of the nervous system as well as to develop a clinical approach to the assessment and management of a variety of nervous system disorders and disease states. *Prereq. PA students only.*

**PA 3102 Principles of Electrocardiography** 4 QH  
Examines principles of electrophysiology and its application to electrocardiographic tracing. Topics include recognizing arrhythmias, rate and axis determination, conduction abnormalities, characteristic changes seen in myocardial infarction and ischemia, as well as drug and metabolic effect manifested on the electrocardiogram. *Prereq. PA students only.*

**PA 3103 Rehabilitation Medicine** 4 QH  
Studies techniques of effective planning and decision making for patients with multiple chronic problems. The purposes, techniques, and potential of rehabilitation medicine are also discussed. *Prereq. PA students only.*

**PCL 1300 Basic Pharmacology 1** 2 QH  
Covers the classification, mechanism of action, and uses of a spectrum of therapeutic agents. Emphasizes dose response, side effects, and adverse reactions. *Prereq. PA students only.*

**PCL 1301 Basic Pharmacology 2** 3 QH  
Examines the classification, mechanisms of action, and uses of a broad spectrum of therapeutic agents. Focuses on dose response, side effects, and adverse reactions. *Prereq. PA students only.*

**PHL 3265 Issues in Medical Ethics** 4 QH  
Familiarizes students with various philosophical perspectives in medical ethics, including historical, classical, ethical, and contemporary philosophies related to issues such as abortion, truth telling, genetic control, and the allocation of scarce medical resources. Discusses euthanasia and paternalism, among other topics. *Prereq. PA students only.*

**SOC 3226 The Aging Process** 3 QH  
Studies the socioeconomic and social-psychological consequences of aging from the perspective of health care providers. Focuses on the biological changes entailed in aging and the appropriate medical management of geriatric patients. *Prereq. PA students only.*



Elective/Specialty Course Selections  
from Other Programs





- ACC 3301 Financial and Managerial Accounting**  
Examines and evaluates financial and managerial processes to develop the participant's ability to request, use, and supply financial information. Includes financial statement analysis, funds flow, cost behavior, budgeting, capital investment analysis, and management control systems. For nonbusiness majors.
- BIO 3510 Environmental and Population Biology** 2 QH  
Examines physiochemical factors influencing and influenced by organisms. Explores interaction among individual organisms and among species. Students are expected to participate in lectures and labs given for BIO 1211, and are assigned individual work on specialized aspects of ecology. Open only to graduate students completing deficiencies in entrance requirements. *Prereq.* One year of general biology, including plant and animal biology.
- BIO 3516 Aquatic Ecology** 4 QH  
Studies rivers, lakes, and estuaries. Focuses on physical and chemical factors, seasonal and regional variations of these factors, interactions between these factors and the effects on the biotic community. Examines examples of current and classical ecological research in each of the three aquatic communities. *Prereq.* BIO 1211.
- BIO 3520 Environmental Microbiology** 4 QH  
Studies the microbial environment and ecology of the cell. Explores interactions between microbial populations, stressing soil and freshwater associations. *Prereq.* BIO 1320 or equiv.
- BIO 3521 Food Microbiology** 3 QH  
Investigates microbiology of food with emphasis on pathogenic types and their interactions with other groups indigenous to food. Discusses food fermentations, food processing, and environmental factors influencing growth and development of microorganisms in food. *Prereq.* BIO 1320 or equiv.
- BIO 3522 Food Microbiology Laboratory** 2 QH  
Focuses on detection, quantification, and isolation of microorganisms and their products of significance in food with emphasis on the pathogenic types. *Prereq.* BIO 3521; may be taken concurrently.
- BIO 3527 Animal Virology** 3 QH  
Examines physical and chemical properties of viruses, viral replication, genetics, cytopathology, and tumor viruses. Covers medical virology, including pathogenesis, clinical features, epidemiology, and immunization of the common viral diseases. *Prereq.* BIO 1320 or equiv.
- BIO 3528 Animal Virology Laboratory** 2 QH  
Studies cultivation and identification of viruses. Includes use of animals, eggs, and animal cell cultures for viral assays. *Prereq.* BIO 3527; may be taken concurrently.
- BIO 3550 Cardiovascular Physiology** 3 QH  
Studies the physiology of blood cells, anemia, polycythemia immunity, and allergy. Examines electrophysiology of the heart, cardiac cycle, EKG, hemodynamics, capillary dynamics, pulmonary circulation, cardiovascular reflexes, cardiac output, and venous return. Also covers cardiac failure, coronary circulation, atherosclerosis, hypertension, cerebral circulation, and circulatory shock.
- BIO 3552 Osmotic and Ionic Regulation** 2 QH  
Investigates comparative physiology of regulation and transport of water and the principal solutes in animals. Discusses principles and underlying mechanisms as well as examples selected from a variety of phyla. *Prereq.* Basic physiology.
- BIO 3558 Vertebrate Endocrinology** 3 QH  
Studies principles of hormonal regulation of physiological processes in vertebrates, mechanisms of hormone action, and neuroendocrine relationships.
- BIO 3559 Animal Nutrition** 2 QH  
Offers detailed consideration of organic and inorganic nutritional requirements of humans and selected animals. Covers digestion, absorption, and metabolism of nutrient materials. Examines role of vitamins, minerals, and trace elements in metabolism. Topics also include variation in nutritional needs among normal individuals and in various physiological and genetic pathologies, and evaluation of food additives and of permissible levels of toxic materials in food. *Prereq.* Basic biochemistry or permission of instructor.
- BIO 3560 Genetics and Developmental Biology** 2 QH  
Elaborates the classic laws of heredity, including cytogenetics and chemical basis of heredity. Presents selected examples of the development of form and function. Requires that students participate in lectures and labs given for BIO 1260 and perform extra individual work. Open only to graduate students completing deficiencies in entrance requirements. *Prereq.* General biology.
- BIO 3561 Cell Physiology and Biochemistry** 2 QH  
Examines basic chemical and physical processes of cells related to their fine structure; oxidative and intermediary metabolism, photosynthesis, and membrane phenomena; movement; and chemical and physical processes of prokaryotic and eukaryotic cells. Requires that students participate in lectures and labs given for BIO 1261 and perform extra individual work. Open only to graduate students completing deficiencies in entrance requirements. *Prereq.* General biology, college physics, and organic chemistry.
- BIO 3601 Biological Electron Microscopy** 4 QH  
Presents techniques of electron microscopy applied to biological materials. Discusses specimen preparation, fixation, thin-sectioning, staining, operation of electron microscope, photographic, techniques, and interpretation of electron micrographs. Requires student seminars and project. *Prereq.* Permission of instructor.

**BIO 3608 Advanced Developmental Biology Laboratory** 2 QH

Analyzes the fundamental problems of development through experimental techniques. Covers the culture of vertebrate and invertebrate embryos, microsurgical analysis of morphogenesis, biochemistry of development, cell-cell interactions, and organ and tissue culture. Includes five hours of lab per week. *Prereq.* BIO 3607 or permission of instructor.

**BIO 3609 Cellular Aspects of Development** 3 QH

Studies animal and plant development at the cellular level. Topics include cell-cell interaction, cell surface differentiation, differential cell adhesion, genetic and epigenetic control or pattern formation, and ultra-structural aspects of fertilization and development. Stresses reading and interpretation of the primary literature. Includes three hours of lecture per week.

**BIO 3617 Environmental Law** 2 QH

Reviews the scientific information required for implementation of the legal and political aspects of environmental management. Discusses the role of the scientist as an expert witness. Studies scientific and legal predictability. Presents analyses of suitable dynamic models and case law with the goal of improving the results of legal, political, and scientific decisions bearing upon remedial environmental management. *Prereq.* Biology core and first course in physiology, such as BIO 1258 and BIO 1259.

**BIO 3620 Industrial Microbiology** 3 QH

Investigates microorganisms and methods employed in production of products of economic and medical importance, decomposition of wastes, and control of desirable and unwanted processes and biodeterioration. Emphasizes fermentation processes. *Prereq.* BIO 1420, *equiv.*, or permission of instructor.

**BIO 3621 Industrial Microbiology Laboratory** 2 QH

Offers lab and discussion seminar sessions devoted to the study of selected commercial processes.

**BIO 3652 Comparative Neurobiology** 3 QH

Presents a cellular approach to structure and function of the nervous system. Topics include neuronal anatomy, cellular properties of single neurons, synaptic transmission, integration in nerve cells, nerve networks, sensory systems, motor systems, sensory-motor integration, specification of neuronal connectivity, and phylogeny of nervous systems. *Prereq.* General (animal) physiology.

**BIO 3657 Neurophysiology Laboratory** 2 QH

Introduces neurophysiological methods. *Prereq.* BIO 3652; may be taken concurrently.

**BIO 3661 Human Genetics** 3 QH

Applies basic genetic principles to the study of variability in humans. Focuses primarily on cytogenetics, biochemical genetics, monogenetics, and multifactorial inheritance and population genetics. Topics of special interest include sex determination and differ-

entiation, early embryology, twinning, birth-defect etiology, prenatal diagnosis, and genetic counseling. *Prereq.* BIO 1260 or *equiv.*

**BIO 3563 General Biochemistry Laboratory** 4 QH

Introduces modern research techniques used in biochemistry and molecular biology. Topics include purification and characterization of proteins, kinetic properties of enzymes, isolation of high molecular weight DNA, recombination of DNA molecules in vitro, isolation of bacterial clones containing recombinant molecules, and in vitro mutagenesis. The course includes two hours of lecture and seven hours of lab. *Prereq.* Permission of instructor.

**BIO 3667 Biochemistry Laboratory Rotation 1** 3 QH

Offers experience in biochemical research; students spend six weeks in each of two labs during the winter quarter. Required of all first-year graduate students in biochemistry, cell physiology, and molecular biology.

**BIO 3668 Biochemistry Laboratory Rotation 2** 3 QH

Offers a continuation of BIO 3667 during the spring quarter.

**BIO 3669 Biochemistry Laboratory Rotation 3** 3 QH

Offers a continuation of BIO 3668 during the summer quarter. Intended for students who have not yet chosen a lab in which to carry out thesis work.

**CHE 3500 Transport Phenomena Winter Quarter, As Announced** 4 QH

Presents and solves momentum rate conservation equations for steady-state fluid flow in two-dimensional boundary layers to obtain the fluid velocity profiles. Uses the solutions to consider heat and mass transfer phenomena at a fluid-solid interface. Applies the development of surface renewal theory to the description of heat and mass transfer phenomena. *Prereq.* BS degree in chemical engineering.

**CHM 3521 Analytical Separations**

Studies theory and practice of fundamental analytical separation techniques. Concentrates on chromatographic processes, including gas and high-performance liquid chromatography. Explores capillary/conventional electrophoresis, supercritical fluid chromatography, chiral resolutions in GC/HPLC/HPCE, and methods development with overall validation approaches.

**CHM 3522 Advanced Analytical Separations**

Continues CHM 3521. *Prereq.* CHM 3521.

**CHM 3524 Electroanalytical Chemistry 2**

Offers a continuation of CHM 3523. Considers equilibrium and nonequilibrium techniques in electroanalytical chemistry. Covers electrode processes, chronopotentiometry, cyclic voltammetry, and recent advances in electroanalytical chemistry. *Prereq.* CHM 3523.



**CHM 3525 Optical Methods of Analysis 1**

Studies theory and principles of molecular absorption and emission processes, instrumentation for optical methods of analysis, and specific applications and approaches for use of optical methods. Specific topics include ultraviolet-visible, fluorescence/phosphorescence, infrared, Raman, refractometry, interferometry, polarimetry, circular dichroism, optical rotatory dispersion, light scattering for polymer analysis, optical absorption/emission detectors for HPLC, chemiluminescence, micellar enhancement in spectroscopy, and other special topics of recent development and application.

**CHM 3526 Optical Methods of Analysis 2**

Examines principles and applications of atomic and X-ray spectroscopies. Discusses such topics as atomic emission, atomic absorption, atomic fluorescence, X-ray fluorescence and diffraction, and photoelectron spectroscopies.

**CHM 3527 Analytical and Organic Mass Spectrometry**

Covers theory and practice of mass spectrometry in chemical analysis. Studies principles of formation of mass spectra of organic compounds, and modern ancillary techniques using mass spectrometric detectors. *Prereq.* One year of organic chemistry and instrumental analysis.

**CHM 3529 Chemical Instrumentation 1: Measurements and Control**

Presents a lecture lab course illustrating the design of electronic instruments used for chemical measurements. Topics include circuit analysis, transducer characteristics, circuits using basic semiconductor devices, integrated circuits, signal amplification, and signal processing. Emphasizes interfacing and interrelation of circuits.

**CHM 3530 Chemical Instrumentation 2: Computer Interfacing**

Offers a lecture lab course illustrating the interface to chemical instruments. Topics include digital logic, computer architecture, data processing, A/D and D/A conversions, and parallel and serial input/output. Provides detailed coverage of standard interfaces such as the 20 mA current loop, RS-232C, and the IEEE-488 GPIB. *Prereq.* CHM 3529.

**CHM 3531, CHM 3532 Topics in Analytical Chemistry 1, 2** **2 QH each**

Presents selected topics of current importance in analytical chemistry. *Prereq.* Permission of instructor.

**CHM 3541 Advanced Inorganic Chemistry 1**

Surveys current experimental and theoretical molecular structure techniques in detail, with emphasis on modern inorganic chemistry examples that are predominantly diamagnetic. Includes symmetry and group theoretic predictions of electronic, infrared, and Raman spectral activity. Considers the basics of NMR spectra of important

inorganic nuclei ( $H^1$ ,  $F^{19}$ ,  $B^{10}$ ,  $B^{11}$ ,  $P^{31}$ ,  $Co^{59}$ ) along with quadrupolar effects, the electric field gradient tensor, and heteronuclear decoupling. Provides applications of NMR spectroscopy to the temperature-dependent stereochemical nonrigidity (fluxionality) of organometallic and traditional main group nonmetal compounds.

**CHM 3542 Advanced Inorganic Chemistry 2**

Discusses detailed electronic theories, such as crystal and ligand field theories and the molecular orbital approach, of structure and spectra of transition metal atoms, ions, and complexes. Derives energy-level diagrams with the aid of the rotation matrix and group as well as double groups. Continues structure characterization techniques, emphasizing paramagnetic phenomena as investigated by electron spin resonance and DC magnetic susceptibility measurements. Introduces cooperative magnetic ordering phenomena (anti-, ferro-, and ferri-magnetism) and nuclear gamma resonance (Mossbauer effect) spectroscopy. *Prereq.* CHM 3541.

**CHM 3563 Physical Organic Chemistry**

Examines relation of experimental properties to orbital concepts, aromaticity and antiaromaticity, pericyclic reactions, and photochemistry. *Prereq.* CHM 3562 or permission of instructor.

**CHM 3564 Spectrometric Identification of Organic Compounds**

Studies interpretation of the ultraviolet, infrared, and nuclear magnetic resonance spectra of organic compounds. *Prereq.* One year of organic chemistry.

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**CHM 3581 Chemical Thermodynamics 1**

Covers First Law of Thermodynamics, Thermochemistry, Second and Third Laws, free energies, and reaction and phase equilibria. *Prereq.* Permission of instructor.

**CHM 3582 Chemical Thermodynamics 2**

Introduces the Boltzmann distribution, partition functions and their application to thermodynamics, and phase space. Applies statistical thermodynamics to selected physical systems. *Prereq.* CHM 3581.

**CHM 3583 Chemical Thermodynamics 3**

Explores statistical thermodynamics applied to gases, liquids, solids, and irreversible thermodynamics. *Prereq.* CHM 3582 and CHM 3592.

**CHM 3591 Introductory Quantum Chemistry 1**

Introduces quantum mechanics and applications to simple systems. Topics include perturbation theory and applications, harmonic oscillator, rigid rotor and applications to microwave and infrared

**CHM 3594 Chemical Kinetics**

Explores use of experimental data to deduce the rate law of a reaction. Covers mechanisms deduced from rate laws, and the influence of experimental error on precision of rate constants and activation energies. Examines collision- and transition-state theories of reaction rates. *Prereq.* One year of physical chemistry.

**CHE 3600 Polymer Science****4 QH****Fall Quarter, Alternating Years**

Studies the basic concepts of polymers, thermodynamics of polymer solutions and measurement of molecular weight. Examines the physical and chemical testing of polymers. Investigates the crystallinity in polymers and rheology of polymers. Considers mechanisms and conditions for polymerization of polymers including step-reaction, addition, and copolymerization. Discusses carbon-chain polymers, fibers, and fiber technology. *Prereq.* BS degree in chemical engineering or chemistry.

**CHM 3641 Coordination Chemistry**

Discusses solution phase properties of coordination compounds and experimental methods for the study of thermodynamics stability and kinetic lability. Topics also include kinetics and mechanism of solvent exchange and substitution reactions at transition metal centers. Investigates the classification of redox reaction mechanisms, marcus theory, and phenomenological mechanisms. *Prereq.* CHM 3543.

**CHM 3661, CHM 3662 Organic****2 QH each****Stereochemistry and Reaction Mechanisms 1, 2**

Studies interrelations of the stereochemistry of organic molecules with their physical and chemical behavior. Examines conformational analysis, and the effects of spatial relationships on transition states, equilibria, and reaction rates as an introduction to the study of organic reaction mechanisms. *Prereq.* CHM 3563.

**CHM 3663, CHM 3664 Organic Reaction Mechanisms and Organic Synthesis 1, 2****2 QH each**

Introduces the theory and practice of organic synthesis, including mechanistic aspects as they influence synthetic design and practice. *Prereq.* CHM 3662 (may be taken concurrently).

**CIV 3372 Air Sampling and Analysis  
Spring Quarter, Alternate Years****2 QH**

Discusses the basic design considerations and requirements for air quality surveillance. Examines the methodologies for air quality sampling; sampling frequencies; measurement techniques; and data acquisition, handling, and analysis. Discusses manual and automated techniques for evaluating source and ambient systems. Employs statistical techniques to evaluate air quality management strategies. *Prereq.* CIV 3370.

**CIV 3374 Air Pollution Science****2 QH****Fall Quarter**

Explores the biological and chemical aspects of air pollution, emphasizing the toxicological aspects of the environment, physiological effects of aerosols, analysis of organic and inorganic constituents of the atmosphere, and rationale for establishment of air quality criteria and standards. Open to nonengineering as well as to engineering graduate students.

*Prereq.* Permission of department and instructor.

**CIV 3376 Industrial Hygiene****2 QH****Winter Quarter**

Studies the characterization and control of industrial problems associated with noise, heat, and ventilation. Discusses the physical and biological aspects of environmental stress. Emphasizes the application of engineering principles to the design of control systems. Reviews evaluation procedures for control effectiveness. *Prereq.* Admission to Graduate School of Engineering.

**ECN 3110 Introduction to Microeconomic Theory for Master of Science Students****4 QH**

Covers basic microeconomic theory, including consumption, production and cost theory, market structure and welfare economics. This course is equivalent to ECN 3010.

**ECN 3350 Economics of the Labor Market and Labor Force I**

Presents labor force measurement and determinants, participation and composition, and microanalysis of labor supply and demand. Topics also include varieties of labor markets and their functioning, labor allocation and migration, minimum wages, and applications of human capital theory to the labor force. *Prereq.* ECN 3010 or ECN 3110.

**ECN 3354 Economics of Medical Care**

Discusses the organization of medical care, the problems associated with various alternative delivery systems, and the utilization and availability of physicians and other paramedical personnel. Examines the growth and pressures exerted by third-party payers; considers federal, state, and municipal participation in the delivery of quality medical care under various alternatives for national health insurance.

**ED 3342 Research Design in Education**

Introduces scientific methods of research in education and related fields. Stresses critical reading and understanding of research literature, formulating research hypotheses, constructing a research proposal, and carrying out an individual or group project. Must be included among the first six courses taken by each student. *Prereq.* Satisfactory completion of the statistics proficiency examination or satisfactory completion of any graduate-level statistics course offered by Boston-Bouvé College (Students wishing



to make arrangements to take the proficiency examination should call 617-437-3302).

### **ED 3343 Advanced Research Design**

Focuses on methodologies for collecting, interpreting, and evaluating data and deals with biases encountered in the data-collection process. Topics include data collection and interpretation, use of sampling, analysis of variance, covariance, multiple regression, multivariate procedures, and advanced topics in scaling, semantic differential methodology, questionnaire design, interview methodology, and evaluative criteria. Requires students enrolling for this course to design and complete a proposal on this design for the conduct of a research project, which may be carried out as part of a research on either the master's or doctoral level. *Prereq.* ED 3341, equiv., or permission of instructor.

### **FIN 3301 Financial Analysis**

Traces the flow of funds within an organization, working capital management, capital markets, capital budgeting, and financial analysis. Builds on topics covered in ACC 3301. For nonbusiness majors.

### **HRM 3301 Organizational Behavior**

Serves as a critical component in preparing for increased responsibilities in the management of human resources. Studies leadership, group dynamics, motivation, power, business ethics, organizational structure, and change. Emphasizes practical application of specific skills, theories, and concepts. For nonbusiness majors.

### **IIS 3110 Pascal for Information Systems** 4 QH **Fall, Winter, and Spring Quarters**

Introduces the Pascal programming language. Topics include algorithms and structured programming, primitive data types, control constructs, subprograms, compound data types (arrays, records), recursion, abstract datatypes, input/output processing, pointers, and object-oriented programming. *Prereq.* Admission to graduate program.

### **IIS 3113 Basic Probability and Statistics** 4 QH **Fall and Winter Quarters**

Offers fundamental concepts of probability. Presents events, sample space, discrete and continuous random variables. Discusses density functions, mass functions, cumulative probability distributions, and moment generating functions. Explores expectation of random variables, as well as common discrete and continuous probability distributions including binomial, poisson, geometric, uniform, exponential, and normal. Topics also include multivariate probability distributions, covariance and independence of random variables, sampling and descriptive statistics, parameter estimation, confidence intervals, and hypothesis testing. *Prereq.* Admission to graduate program.

### **IIS 3512 Stochastic Modeling and Queuing Systems** 2 QH **Spring Quarter**

Develops the probability techniques necessary for the study of queues, Poisson process, and semi-Markov and Markov process. Analyzes the behavior of queueing systems, single and multiple queues, queues with general arrival and general server, and queues with priority. *Prereq.* IIS 3113.

### **IIS 3517 Statistical Decision Theory** 2 QH **Winter Quarter**

Explores the use of Bayesian statistical inference to arrive at decisions when stochastic variables are interacting. Topics include the relationship to game theory; decision making over time in a sequence; important expected values and distributions; and relationship of Bayesian decision theory to classical statistical inference. *Prereq.* IIS 3506 and IIS 3523.

### **IIS 3523 Applied Statistics** 4 QH **Winter and Spring Quarters**

Develops statistical models for analysis and prediction of random phenomena. Topics include descriptive statistics and hypothesis testing; linear models, both regression and ANOVA; and chi-squared and non-parametric tests. Introduces design of experiments. Emphasizes applying linear models in real-life situations. *Prereq.* IIS 3113.

### **MKT 3301 Marketing**

An organization's link to its market is a crucial aspect of the management process. This course begins with market analysis and market research and builds on the planning framework examining product, pricing, advertising, sales management and distribution. For nonbusiness majors.

### **MKT 3914 Consumer Behavior**

Offers development of an understanding of consumer attitudes and behavior processes. Examines and evaluates various economic and behavioral models of consumer behavior as bases for the planning and evaluation of marketing strategies. *Prereq.* MKT 3812.

### **MSC 3301 Operations**

Explores the strategic nature of operations planning. Stresses capacity planning, quality control, product liability, production scheduling and control. Highlights the interdependence of sound financial planning, effective marketing strategies and corporate decision making. For nonbusiness majors.

### **MSC 3832 Introduction to Computer Applications**

Provides a business-oriented introduction to data processing functions and systems. Introduces history, terminology, technology, and economics of data processing hardware and software. Considers management issues in the design, selection, evaluation, and use of computers and computer services. Offers individual familiarization with personal computers

and popular business software. *Prereq. Satisfactory completion of computer programming requirement.*

#### **MTH 3222 Applied Statistics**

**4 QH**

Considers level to measurement, central tendency, dispersion, relatedness and significance to differences, analysis of data through correlation, regression, F-test, Chi square tests, T-test, analysis of variance and analysis of covariance. Uses computer-based statistical subroutine packages. Not for math graduate credit.

#### **MTH 3361 Numerical Analysis I**

**4 QH**

Studies topics such as floating point arithmetic, root finding, divided differences, interpolation and approximation, numerical integration, solution of differential equations, and numerical linear algebra. Students are expected to be reasonably proficient in Pascal, FORTRAN, or C. Requires writing computer programs.

#### **MTH 3362 Numerical Analysis 2**

**4 QH**

Studies the numerical solution of partial differential equations, with emphasis on elliptic equations and the finite element method. Same as COM 3762. *Prereq. MTH 3361 or equiv.*

#### **POL 3523 Interest Groups**

Surveys the role of interest groups in American politics, with emphasis on distinctions between traditional economic interests, newer types of social forces, and public interest organizations.

#### **POL 3601 Public Personnel Administration**

Introduces students to the public personnel function from a managerial standpoint. Addresses methods of constructive leadership of government personnel, leadership that encourages a more competent, motivated, and representative, public administrative workforce. Employs case studies and films, along with assigned readings. MPA core course.

#### **POL 3630 Health Administration**

Introduces administration in hospitals and other health care organizations. Topics include financial management, quality and utilization control, strategic planning, marketing, personnel management, and information systems. Health Administration and Policy concentration requirement. MPA elective.

#### **POL 3644 Public Policy Issues in Human Services**

Discusses the origins and development of the Social Security Public Assistance Income Maintenance and various health-care programs. Focuses on controversial public policy issues of retirement, survivors, disability insurance, Aid to Families with Dependent Children, Medicare, and Medicaid, with the objective of helping students to develop understanding of the push and pull of many different viewpoints involved in public policy development. *MPA elective.*

#### **POL 3648 Legal Topics for Health Administration**

Provides an overview of legal issues and topics of relevance to the field of health administration, including malpractice, accreditation, and affiliations. *MPA elective.*

#### **POL 3672 Policy Issues and Administration in Mental Health Care**

Analyzes policymaking and administration within the contemporary mental health system, with a special focus on the process and impacts of deinstitutionalization. *MPA elective.*

#### **POL 3675 Health Policy and Politics**

Introduces contemporary health care policies, programs, and politics. Discusses the current crisis in health care costs, with proposed solutions such as health planning, certificate-of-need regulation, and different health insurance reimbursement mechanisms. Health Administration and Policy concentration requirement. MPA elective.

#### **POL 3699 Seminar in State and Urban Administration**

Analyzes specified topics and issues in state and urban administration with the purpose of presenting material of current interest and allowing in-depth research into specified areas where appropriate. Subject matter to be covered is described in registration materials. MPA elective.

#### **SOC 3165 Sociology of Education**

Analyzes the structure and functioning of educational institutions, and presents student, faculty, and administrative perspectives. Emphasizes the role of education in processes of socialization, social mobility, social change, and social control.

#### **SOC 3176 Sociology of Occupations and Professions**

Studies the relations between the occupations and professions and society. Special topics may include occupational stratification, professional group behavior, recruitment and socialization of occupations and professions, and political activism.

#### **SOC 3215 Sociology of Medicine**

Studies social aspects of illness and medicine, historically and cross-culturally. Focuses on illness and the medical profession in modern society and their structural settings: the community, the hospital, the medical school. Critically examines research studies in the field and specifies problems for future research.

#### **SOC 3226 Processes of Aging**

Considers socioeconomic and social psychological consequences of aging from the perspective of health-care providers. A major part of the course focuses directly on the biological changes entailed in aging and the appropriate medical management of geriatric patients. Open to students expected to provide health care services to geriatric patients.



**SOC 3240 Formal Organizations: Administration and Structure**

Analyzes the goals and functions of modern organizations. Examines aspects of bureaucratization within business firms, public institutions, and private associations.

**SOC 3286 Sociology of Science**

Presents selected topics dealing with interactions between science and society.







